

IN THE DRAWINGS:

Attached hereto is a Replacement Sheet containing Figures 3a and 3b.

REMARKS

Claims 1, 3-12 and 14-24 are pending in the application and stand rejected. By the above amendment, claims 1, 6, 7, 9, 12, 17, 18 and 20 have been amended and claims 5, 10, 11, 16 and 21-24 have been canceled without prejudice. The Examiner's reconsideration of the rejections and objections is respectfully requested based on the above amendments and following remarks.

Drawing Objections:

Applicants have submitted a Replacement Sheet for FIGs. 3a and 3b. Applicants will submit a complete set of Formal drawings in due course. Accordingly, withdrawal of the current drawing objections is respectfully requested.

Claim Rejections - 35 U.S.C. § 102

Claims 1, 3-5, 7, 12, 14-16 and 18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No 5,696,838 to Chiu et al., for the reasons set forth on Pages 2-4 of the Office Action.

At the very least, claims 1 and 12 are believed to be patentably distinct and patentable over Chiu. With the inventions of claims 1 and 12, a template-based marker recognition process is provided, wherein a trained model includes image templates for a first template class and a second template class. *The template image for the first class is trained from one or more images of a ROI having a marker, and the template image for the second class is trained from one or more images of the ROI not having the marker.* With these methods, both classes of template images are used to determine whether or not an actual input image of the given ROI contains a marker.

It is submitted that Chiu does not disclose template-based marker recognition using first and second template classes, as essentially claimed in claims 1 and 12. On page 4 of the Office

Action, the Examiner cites Col. 6, lines 48-63 and Appendix II of Chiu as disclosing templates of markers and template images not having a marker. Applicants respectfully disagree with Examiner's characterization of Chui in this regard.

Chui discloses (in the cited section) using a plurality of patterns containing *fragments of the cross pattern* for purposes of training a neural network to be able to recognize pattern fragments when searching for marks in a captured image. Examiner interprets the fragment-type templates *not containing the entire cross pattern* (as taught by Chiu) as being the same as template images *not having a target marker* (as claimed). Applicants respectfully submit that this interpretation is unduly strained in view of the teachings of Applicants specification (see, Page 10, line 14 ~ Page 11, line 7; and FIGs. 1a and 1b, for example).

In any event, Chui does not disclose that the "perfect reference model" of the cross pattern or that the image patterns containing mark fragments are templates (models) that are trained using one or more actual images of a given ROI having a marker and the given ROI not having the marker (see, e.g., FIGs. 1a and 1b), as essentially claimed. Indeed, Chui is directed to pattern searching method, wherein an actual image (to be processed) is sub-divided into a plurality of sub-images having the same size as reference models representing a target pattern and partial reference models representing fragments of the target pattern. Each sub-image is processed using a neural network that is trained with the reference models and partial reference models to search for candidate sub-images that may contain the desired pattern (see, e.g., Col. 2, lines 29-43). In this regard, it is clear that the reference models and partial reference models are not image patterns of a particular ROI having a target marker and the ROI not having the target marker, as essentially claimed in claims 1 and 12.

Accordingly, claims 1 and 12 are believed to be patentably distinct and patentable over Chiu. Claims 5 and 16 have been cancelled without prejudice and, thus, the specific rejections are moot. Furthermore, 3, 4, 7, 12, 14, 15 and 18 are patentably distinct and patentable over Chiu at least by virtue of their dependence from respective base claims 1 and 12. Therefore, withdrawal of the anticipation rejections is requested.

Claim Rejections - 35 U.S.C. § 103

The following claim rejections are asserted under 35 U.S.C. §103(a):

- (i) Claims 1 and 12 stand rejected as being unpatentable over U.S. Patent No. 6,611,622 to Krum and U.S. Patent No. 6,678,404 to Lee;
- (ii) Claims 6 and 17 stand rejected as being unpatentable over Chiu and U.S. Patent No. 6,031,539 to Kang et al;
- (iii) Claims 8 and 19 stand rejected as being unpatentable over Chiu and U.S. Patent No. 6,445,822 to Crill;
- (iv) Claims 9, 10, 11, 20, 21 and 22 stand rejected as being unpatentable over Krumm and Lee and further in view of U.S. Patent No. 6,310,964 to Mohan; and finally
- (v) Claims 23 and 24 stand rejected as being unpatentable over Chiu and Krumm.

With respect to the above obviousness rejection (i), the basis for the rejection is legally deficient on its face. Indeed, the obviousness analysis for claims 1 and 12 as set forth on page 5-6 of the Office Action fails to address all claim elements, which is improper as a matter of law. A *prima facie* case of obviousness can not be established against claims 1 or 12 based on Krumm and Lee by merely addressing some elements of the claims.

In any event, the combined teachings of Krumm and Lee do not disclose or suggest *a template image for a first class which is trained from one or more images of a ROI having a*

maker, and a template image for a second class which is trained from one or more images of the ROI not having the marker, as essentially claimed in claims 1 and 12.

With respect to the above obviousness rejections (ii) and (iii), these rejections are based, in part, on Chiu as disclosing the elements of claims 1 and 12, from which claims 6, 8, 17 and 19 depend. As noted above, however, Chiu does not disclose or suggest *a template image for a first class which is trained from one or more images of a ROI having a maker, and a template image for a second class which is trained from one or more images of the ROI not having the marker,* as essentially claimed in claims 1 and 12. Moreover, neither Kang nor Crill cure the deficiencies of Chiu in this regard.

With respect to the above obviousness rejection (v), this rejection has been rendered moot by the cancellation of claims 23 and 24.

Finally, with respect to the above obviousness rejection (iv), Applicants respectfully submit that at the very least, claims 9 and 20 are patentable and non-obvious over the combination of Krumm, Lee and Mohan. Indeed, Applicants submit that such combination does not disclose or suggest, e.g. *generating a local image histogram comprising a gray value distribution for each of a plurality of equal-sized sub-regions of the input image, combining the local image histograms to form a single histogram representation, computing a distance measure between the single histogram representation and the sample image histogram, and determining if a marker is present in the input image based on the computed distance measure,* as essentially claimed in claims 9 and 20.

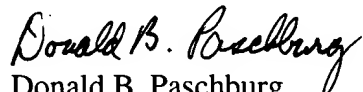
On page 9 of the Office Action, Examiner cites Col. 8, lines 53-58 of Krumm as disclosing a process of generating a plurality of local histograms, but this teaching by Krumm is clearly distinguishable from the claimed inventions. Krumm discloses a process of segmenting a

color image (not grayscale image) of a scene being monitored into a plurality of regions which likely correspond to person or object whose identity is to be determined. A color histogram is then separately generated for each extracted region, and each color histogram is independently and separately assessed/compared against model histograms associated with people or objects that are to be identified in the scene (see, Col. 8, lines 40-51).

In this regard, it is clear that Krumm does not disclose *generating a local image histogram comprising a gray value distribution for each of a plurality of equal-sized sub-regions of the input image.* Moreover, since each color histogram for the extracted regions is processed separately against the reference models, it is clear that Krumm does not disclose or suggest, combining the local image histograms to form a single histogram representation, much less computing a distance measure between the single histogram representation and the sample image histogram. Moreover, neither Lee nor Mohan cure the deficiencies of Krumm in this regard. Accordingly, for at least the above reasons, withdrawal of the obvious rejections is respectfully requested.

Applicants respectfully request favorable reconsideration of the application as now presented. The Examiner is invited to contact the undersigned should he have any questions in this matter.

Respectfully submitted,


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